FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018
12/31/2010

Accepted RJ Aug/01/2011

U.S. Department of Transportation
Federal Aviation Administration

APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

INSTRUCTIONS - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II, VI and VII as applicable.

I. AIRCRAFT DESIGNATION

1. REGISTRATION MARK	2. AIRCRAFT BUILDER'S NAME (Make)	3. AIRCRAFT MODEL DESIGNATION	4. YR. MFR.	FAA CODING
N188HK	General Atomics, ASI	UHK97000-10	2010	
5. AIRCRAFT SERIAL NO.	**6. ENGINE BUILDER'S NAME (Make)**	**7. ENGINE MODEL DESIGNATION**		
FC188	Honeywell	TPE-331-10YGD-514GA		
8. NUMBER OF ENGINES	**9. PROPELLER BUILDER'S NAME (Make)**	**10. PROPELLER MODEL DESIGNATION**	**11. AIRCRAFT IS (Check if applicable)**	
One (1)	McCauley	X3GFR36C606/110GFA-0	IMPORT	

II. CERTIFICATION REQUESTED

APPLICATION IS HEREBY MADE FOR: (Check applicable items)

- A 1 — STANDARD AIRWORTHINESS CERTIFICATE (Indicate Category) — NORMAL | UTILITY | ACROBATIC | TRANSPORT | COMMUTER | BALLOON | OTHER
- B ✓ — SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items) — UNMANNED AIRCRAFT
  - 7 — PRIMARY
  - 9 — LIGHT-SPORT (Indicate Class) — AIRPLANE | POWER-PARACHUTE | WEIGHT-SHIFT-CONTROL | GLIDER | LIGHTER THAN AIR
  - 2 — LIMITED
  - 5 — PROVISIONAL (Indicate Class) — 1 CLASS I; 2 CLASS II
  - 3 — RESTRICTED (Indicate operation(s) to be conducted) — 1 AGRICULTURE AND PEST CONTROL; 2 AERIAL SURVEY; 3 AERIAL ADVERTISING; 4 FOREST (Wildlife Conservation); 5 PATROLLING; 6 WEATHER CONTROL; 0 OTHER (Specify)
  - 4 ✓ — EXPERIMENTAL (Indicate operation(s) to be conducted) — 1 ✓ RESEARCH AND DEVELOPMENT; 2 AMATEUR BUILT; 3 EXHIBITION; 4 AIR RACING; 5 ✓ CREW TRAINING; 6 ✓ MARKET SURVEY; 0 TO SHOW COMPLIANCE WITH THE CFR; 7 OPERATING (Primary Category) KIT BUILT AIRCRAFT; 8 OPERATING LIGHT-SPORT — 8A Existing Aircraft without an airworthiness certificate & do not meet § 103.1; 8B Operating Light-Sport Kit-Built; 8C Operating light-sport previously issued special light-sport category airworthiness certificate under § 21.190
  - 8 — SPECIAL FLIGHT PERMIT (Indicate operation(s) to be conducted, then complete Section VI or VII as applicable on reverse side) — 1 FERRY FLIGHT FOR REPAIRS, ALTERATIONS, MAINTENANCE, OR STORAGE; 2 EVACUATION FROM AREA OF IMPENDING DANGER; 3 OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT; 4 DELIVERING OR EXPORTING; 5 PRODUCTION FLIGHT TESTING; 6 CUSTOMER DEMONSTRATION FLIGHTS
- C 6 — MULTIPLE AIRWORTHINESS CERTIFICATE (check ABOVE "Restricted Operation" and "Standard" or "Limited" as applicable)

III. OWNER'S CERTIFICATION

A. REGISTERED OWNER (As shown on certificate of aircraft registration) — IF DEALER, CHECK HERE →

NAME	ADDRESS
General Atomics, Aeronautical Systems Inc.	14200 Kirkham Way Poway, Ca 92064

B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)

	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.): N/A	✓	AIRWORTHINESS DIRECTIVES (Check if all applicable AD's are complied with and give the number of the last AD SUPPLEMENT available in the biweekly series as of the date of application): 2011-13
	AIRCRAFT LISTING (Give page number(s)): N/A		SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated): N/A

C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS

✓	CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR Section 91.417	TOTAL AIRFRAME HOURS: 0.0	3	EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed): 0.0

D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.

DATE OF APPLICATION	NAME AND TITLE (Print or type)	SIGNATURE
June 30,2011	Gary Bender, Director of Flight Operations	Gary Bender

IV. INSPECTION AGENCY VERIFICATION

A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete the section only if 14 CFR part 21.183(d) applies.

2		14 CFR part 121 CERTIFICATE HOLDER (Give Certificate No.)	3	CERTIFICATED MECHANIC (Give Certificate No.)	6	CERTIFICATED REPAIR STATION (Give Certificate No.)
5		AIRCRAFT MANUFACTURER (Give name or firm)				

DATE	TITLE	SIGNATURE

V. FAA REPRESENTATIVE CERTIFICATION

(Check ALL applicable block items A and B)

A. I find that the aircraft described in Section I or VII meets requirements for — ✓ THE CERTIFICATE REQUESTED; 4 AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE

B. Inspection for a special permit under Section VII was conducted by: — ✓ FAA INSPECTOR; CERTIFICATE HOLDER UNDER; FAA DESIGNEE; 14 CFR part 65; 14 CFR part 121 OR 135; 14 CFR part 145

DATE	MIDO/FSDO Office	4	DESIGNEE'S SIGNATURE AND NO.	1	FAA INSPECTOR'S SIGNATURE
June 30, 2011	ANM-108L				RICHARD SCHOENBERGER

VI. PRODUCTION FLIGHT TESTING

A. MANUFACTURER

NAME | ADDRESS

B. PRODUCTION BASIS *(Check applicable item)*

- ☐ PRODUCTION CERTIFICATE *(Give production certificate number)* ⟶
- ☐ TYPE CERTIFICATE ONLY
- ☐ APPROVED PRODUCTION INSPECTION SYSTEM

C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS

DATE OF APPLICATION | NAME AND TITLE *(Print or Type)* | SIGNATURE

VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST

A. DESCRIPTION OF AIRCRAFT

REGISTERED OWNER | ADDRESS

BUILDER *(Make)* | MODEL

SERIAL NUMBER | REGISTRATION MARK

B. DESCRIPTION OF FLIGHT — CUSTOMER DEMONSTRATION FLIGHTS ☐ *(Check if applicable)*

FROM | TO

VIA | DEPARTURE DATE | DURATION

C. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT

☐ PILOT ☐ CO-PILOT ☐ FLIGHT ENGINEER ☐ OTHER *(Specify)*

D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:

E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: *(Use attachment if necessary)*

F. CERTIFICATION – *I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in* accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is safe for the flight described.

DATE | NAME AND TITLE *(Print or Type)* | SIGNATURE

VIII. AIRWORTHINESS DOCUMENTATION (FAA/DESIGNEE use only)

✓	A. Operating Limitations and Markings in Compliance with 14 CFR Section 91.9, as applicable.		G. Statement of Conformity, FAA Form 8130-9 *(Attach when required)*
✓	B. Current Operating Limitations Attached		H. Foreign Airworthiness Certification for Import Aircraft *(Attach when required)*
✓	C. Data, Drawings, Photographs, etc. *(Attach when required)*		I. Previous Airworthiness Certificate Issued in Accordance with 14 CFR Section _____ CAR _____ (Original Attached)
✓	D. Current Weight and Balance information Available in ~~Aircraft~~ GCS		
	E. Major Repair and Alteration, FAA Form 337 *(Attach when required)*	✓	J. Current Airworthiness Certificate Issued in Accordance with 14 CFR Section 21.191(g)(2)(F) *(Copy Attached)*
✓	F. This inspection Recorded in Aircraft Records		K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 *(Attach when required)*

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	**EXPERIMENTAL (UNMANNED AIRCRAFT)**	
	PURPOSE	**Research & Development / Market Survey / Crew Training**	
B	MANU-FACTURER	NAME **N/A**	
		ADDRESS **N/A**	
C	FLIGHT	FROM **N/A**	
		TO **N/A**	
D	N- **188HK**		SERIAL NO. **FC188**
	BUILDER **General Atomics ASI**		MODEL **UHK97000-10**
E	DATE OF ISSUANCE **06/30/2011**		EXPIRY **06/29/2012**
	OPERATING LIMITATIONS DATED **06/29/2011**		ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE **Richard Schoenberger**		DESIGNATION OR OFFICE NO. **ANM-108L**

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

A	This airworthiness certificate is issued under the authority of Public Law 104-6, 49 United States Code (USC) 44704 and Title 14 Code of Federal Regulations (CFR).
B	The airworthiness certificate authorizes the manufacturer named on the reverse side to conduct production fight tests, and only production flight tests, of aircraft registered in his name. No person may conduct production flight tests under this certificate: (1) Carrying persons or property for compensation or hire: and/or (2) Carrying persons not essential to the purpose of the flight.
C	This airworthiness certificate authorizes the flight specified on the reverse side for the purpose shown in Block A.
D	This airworthiness certificate certifies that as of the date of issuance, the aircraft to which issued has been inspected and found to meet the requirements of the applicable CFR. The aircraft does not meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention On International Civil Aviation. No person may operate the aircraft described on the reverse side: (1) except in accordance with the applicable CFR and in accordance with conditions and limitations which may be prescribed by the Administrator as part of this certificate; (2) over any foreign country without the special permission of that country.
E	Unless sooner surrendered, suspended, or revoked, this airworthiness certificate is effective for the duration and under the conditions prescribed in 14 CFR, Part 21, Section 21.181 or 21.217.

GENERAL ATOMICS
AERONAUTICAL

AIRCRAFT MAINTENANCE RECORD

AIRCRAFT/EQUIPMENT S/N	FLIGHT #	ORIGINATOR	DISC	DATE	NCR #	FDR #
N188HK		F. Medrano/ CAMPO		6/30/2010		

DISCREPANCY:

The UAS requires AN FAA Airworthiness inspection with regards to the Application for Special Airworthiness Certificate Experimental for R&D / Crew Training & Market survey

CORRECTIVE ACTION: CAMS SCREEN 122 TAG NUMBER IS THE AFTO 350 TAG NUMBER:

I find this UAS meets the requirements for the certification requested and have issued a Special Airworthiness Certificate Dated: 06/30/2011. The operation of this UAS is contingent upon GA-ASI compliance with Program Letter Dated: 06/10/2011 and the applicable Operating Limitations for this UAS Dated: 06/29/2011. A new Condition Inspection is required prior to issuance of another Special Airworthiness Certificate.

RICHARD SCHOENBERGER
ASI FAA LA-MIDO

PARTS REMOVED

	PART NUMBER	REV	SERIAL NUMBER	NOMENCLATURE	SERIAL TRACK #	HOURS/ CYCLES
A						
B						
C						
D						
E						

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	**EXPERIMENTAL (UNMANNED AIRCRAFT)**	
	PURPOSE	**Research & Development / Market Survey / Crew Training**	
B	MANU-FACTURER	NAME **N/A**	
		ADDRESS **N/A**	
C	FLIGHT	FROM **N/A**	
		TO **N/A**	
D	N- **188HK**		SERIAL NO. **FC188**
	BUILDER **General Atomics ASI**		MODEL **UHK97000-10**
E	DATE OF ISSUANCE **06/30/2011**		EXPIRY **06/29/2012**
	OPERATING LIMITATIONS DATED **06/29/2011**		ARE PART OF THIS CERTIFICATE
	SIGNATURE OF FAA REPRESENTATIVE **Richard Schoenberger**		DESIGNATION OR OFFICE NO. **ANM-108L**

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FAA Form 8130-7 (07/04) SEE REVERSE SIDE NSN: 0052-00-693-4000

	SERIAL TRACK #	HOURS/ CYCLES
A		
B		
C		
D		
E		

AVI

COR

ENGINE HOBBS
PRE / POST
/

EMPLOYEE NUMBER

WORK ORDER #	LOCATION	350 TAG NUMBER		PROJECT NUMBER
SERIAL NUMBER	**SYSTEM/REASON**	**UP**	**DOWN**	**PRTS #**
210679		☐	☐	

06/29/2011

Los Angeles Manufacturing Inspection District Office
3960 Paramount Blvd.
Lakewood, CA 90712

Operating Limitations
Experimental: Research and Development, Market Survey, and/or Crew Training

REGISTERED OWNER NAME: GENERAL ATOMICS AERONAUTICAL SYSTEMS, INC.	**AIRCRAFT BUILDER:** GENERAL ATOMICS AERONAUTICAL SYSTEMS, INC.
REGISTERED OWNER ADDRESS: 14200 KIRKHAM WAY POWAY, CA 92064	**AIRCRAFT SERIAL NUMBER:** FC188
AIRCRAFT DESCRIPTION: PREDATOR B UNMANNED AIRCRAFT FIXED WING, TURBO PROP	**AIRCRAFT MODEL DESIGNATION:** PREDATOR B, UHK97000-10 **ENGINE MODEL:** HONEYWELL TPE331-10YGD-514GA
AIRCRAFT REGISTRATION: N188HK	**PROPELLER MODEL:** MCCAULEY X3GFR36C606/110GFA-0
YEAR MANUFACTURED: 2010	

The following conditions and limitations apply to all flight operations for the General Atomics Aeronautical Systems, Inc., (GA-ASI) Predator B unmanned aircraft system (UAS) while operating in the National Airspace System (NAS).

1. General Information.

a. Integrated system. For the purposes of this special airworthiness certificate and operating limitations, the Predator B Unmanned Aircraft System (UAS) operated by GA-ASI is considered to be an integrated system. The system is composed of the following:

1) Predator B unmanned aircraft, model UHK97000-10.

2) UAS control station(s), fixed, mobile, ground-based, or airborne.

3) Telemetry, launch, and recovery equipment.

4) Communications and navigation equipment, including ground and/or airborne equipment used for command and control of the Predator B UAS.

5) Equipment on the ground and in the air used for communication with the chase aircraft, other members of the flight crew, observers, air traffic control (ATC), and other users of the NAS.

b. Compliance with 14 CFR part 61 (Certification: Pilots, Flight Instructors, and Ground Instructors) and part 91 (General Operating and Flight Rules). Unless otherwise specified in this document, the UA pilot-in-command (PIC) and GA-ASI must comply with all applicable sections and parts of 14 CFR including, but not limited to, parts 61 and 91.

c. Operational requirements.

1) No person may operate this UAS for other than the purpose of research and development, market survey, and/or crew training, to accomplish the flight operation outlined in GA-ASI Program Letter dated 06/10/2011, which describes compliance with § 21.193(d), Experimental certificates: General, and has been made available to the UA PIC.

2) This UAS must be operated in accordance with applicable air traffic and general operating rules of part 91 and all additional limitations herein prescribed under the provisions of § 91.319(i), Aircraft having experimental certificates: Operating limitations.

3) GA-ASI must accumulate at least 50 flight hours flight time on the UAS before customer crew training is permitted, in accordance with § 21.195(d), Experimental certificates: Aircraft to be used for market surveys, sales demonstrations, and customer crew training.

d. UA condition. The UA PIC must determine that the UA is in a condition for safe operation, and in a configuration appropriate for the purpose of the intended flight.

e. Multiple-purpose operations. When changing between operating purposes of a multiple purpose certificate, GA-ASI must determine that the aircraft is in a condition for safe operation and appropriate for the purpose intended. A record entry will be made by an appropriately rated person (that is, an individual authorized by the applicant and acceptable to the FAA) to document that finding in the maintenance records.

f. Operation exceptions. No person may operate this UA to carry property for compensation or hire (§ 91.319(a)(2)).

g. UA markings.

1) This UA must be marked with its U.S. registration number in accordance with part 45 or alternative marking approval issued by the FAA Production and Airworthiness Division, AIR-200.

2) This UA must display the word *Experimental* in accordance with § 45.23(b), Display of marks, unless otherwise granted an exemption from this requirement.

h. Required documentation. Prior to conducting the initial flight operations, GA-ASI must forward a scanned electronic copy of the Program Letter, and signed copies of the Special Airworthiness Certificate, and Operating Limitations to the following persons by email:

1) FAA Western Terminal Service Area, Mark Dillon, Unmanned Aircraft Systems, Air Traffic Control Specialist, Operations Support Group-NISC contractor, ATO, Western

Service Center, Operations Support Group, AJV-W23, mark.ctr.dillon@faa.gov, telephone (425) 203-4522.

2) Thomas Rampulla, Transportation Industry Analyst, Production and Airworthiness Division, AIR-200, 800 Independence Ave, SW, Washington, DC 20591, (202) 385-6684, email: thomas.rampulla@faa.gov.

i. Change in registrant address. Section 47.45, Change of address, requires that the FAA Aircraft Registry be notified within 30 days of any change in the aircraft registrant's address. Such notification is to be made by providing AC Form 8050-1, Aircraft Registration Application, to the FAA Aircraft Registration Branch (AFS-750) in Oklahoma City, Oklahoma.

j. Certificate display and manual availability. The airworthiness and registration certificates must be displayed, and the aircraft flight manual must be available to the pilot, as prescribed by the applicable sections of 14 CFR, or as prescribed by an exemption granted in accordance with 14 CFR part 11, General Rulemaking Procedures, to GA-ASI.

2. Program Letter. The Predator B Program Letter, dated 06/10/2011, will be used as a basis for determining the operating limitations prescribed in this document. All flight operations must be conducted in accordance with the provisions of this document.

3. Authorized Flight Operations.

a. General. The flight operations area authorized for the Predator B UA will be referred to as the Primary Containment Area (PCA) and is depicted graphically below in blue. Flight operations in the PCA shall be conducted within the defined boundaries at or below 13,000 ft MSL. Flight operations above 13,000 ft MSL are not authorized. When operating in a terminal environment, the UA must have line of sight communications. Flight operations shall not be conducted within the Victorville (KVCV) Class D airspace. All operations will be conducted in accordance with the FAA accepted GA-ASI Flight Operations Procedures, ASI-00009 (Civil), and GA-ASI Ground Operations Procedures, ASI-00056 (Civil).

1) VFR cloud clearances and visibilities for Class E airspace will be used regardless of class of airspace the UAS is operating in.

2) Special VFR is not authorized.

b. Description of the authorized flight operations area and flight-testing. The base of operations for the UAS shall be Gray Butte Field, Palmdale, CA and El Mirage Field, Adelanto, CA. Flight operations shall be divided into 2 phases.

1) The following limitations apply to Phase I flight-testing:

a) Shall be conducted within visual line of sight of the pilot/observer,

b) Shall be within a 5 statute mile radius of the airport for the first 10 flight hours, after which the radius may be expanded to 10 statute miles,

c) Shall be conducted at an altitude no greater than 7500 ft. MSL,

d) The aircraft shall not be controlled by satellite communications,

e) Fuel load shall be limited to 5 hours flight time plus reserve required by 14 CFR 91.151.

f) Phase I flight-testing shall be considered complete when all test procedures contained in ASI-00591 are accomplished successfully. Following satisfactory completion of Phase I flight testing, the operations manager or chief pilot must certify in the records that the aircraft has been shown to comply with § 91.319(b). Compliance with § 91.319(b) must be recorded in the aircraft records with the following, or a similarly worded, statement:

"I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vso _____, Vx _____, and Vy _____, and the weight _____ and CG location _____ at which they were obtained."

2) Phase 2 flight-testing authorizes flight in the PCA and the Edwards ranges.

c. After the completion of Phase I flight testing, fuel shall be limited to that necessary to complete the intended mission plus 250 pounds.

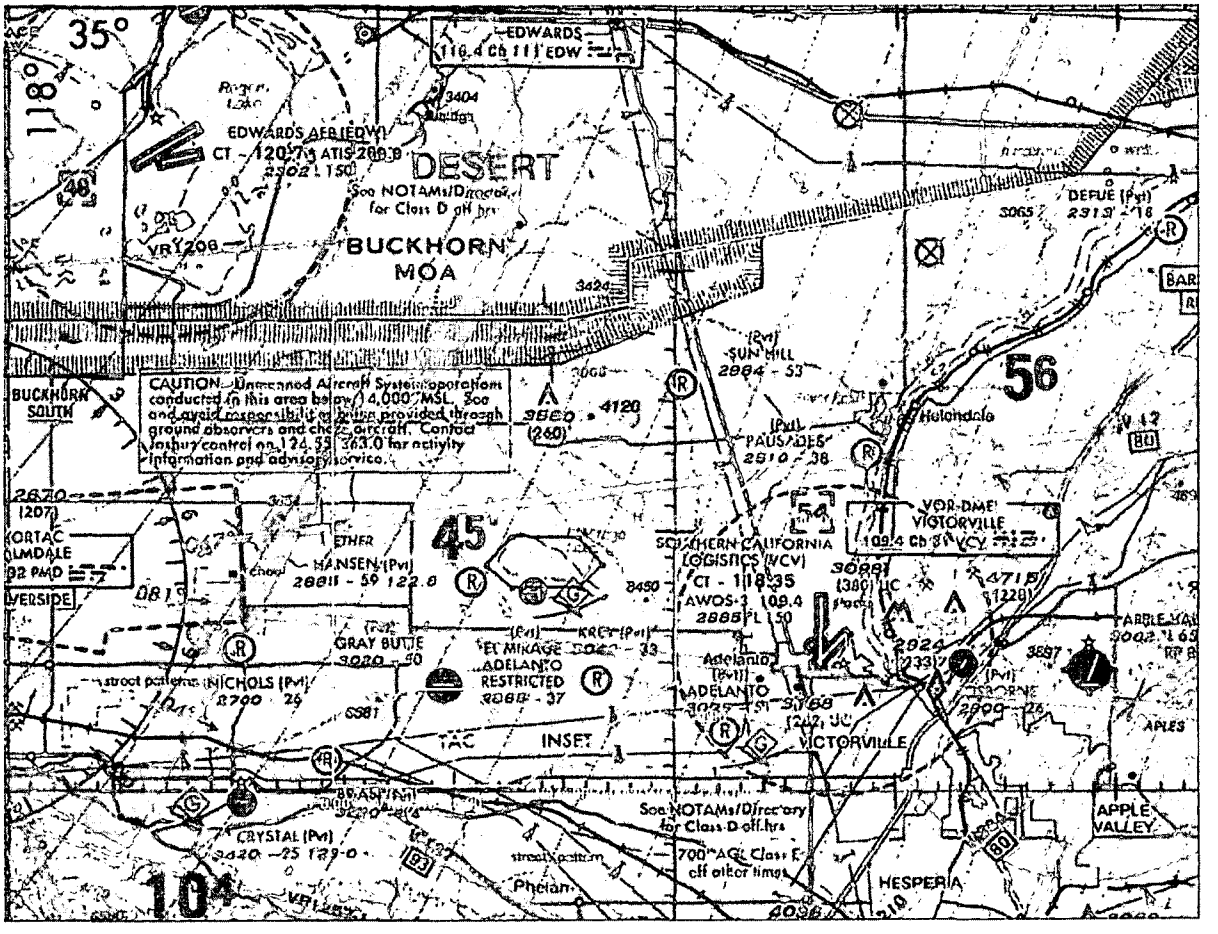

Figure 1: Primary Containment Area

Local Ops Area - BLUE

SW	N34°30'00"	W 117°45'30"
NW	N34°48'00"	W 117°45'30"
N1	N34°48'00"	W 117°35'03"
N2	N34°48'30"	W 117°32'03"
N3	N34°50'15	W 117°32'03"
NE	N34°53'20"	W 117°11'53"
E1	N34°39'30"	W 117°30'00"
SE1	N34°34'00"	W 117°30'00"
SE2	N34°30"00"	W 117°37'00"

Lost Link Orbit Points

El Mirage (99CL) Airport – RED
North Emergency Mission Predator A/B

Waypoints	Approved Orbit Altitudes			
1 N34 38 32 W 117 38 39	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
2 N34 39 36 W 117 37 25	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
3 N34 39 35 W 117 34 29	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
4 N34 38 32 W 117 33 20	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
5 N34 37 38 W 117 34 25	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
6 N34 37 39 W 117 37 28	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL

Gray Butte Field (04CA) Airport – YELLOW
South Emergency Mission Predator A/B

Waypoints	Approved Orbit Altitudes			
1 N34 32 43 W 117 43 24	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
2 N34 33 43 W 117 42 23	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
3 N34 33 44 W 117 39 16	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
4 N34 32 45 W 117 38 07	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
5 N34 31 45 W 117 39 21	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL
6 N34 31 45 W 117 42 13	5,500 MSL	6,500 MSL	7,500 MSL	8,500 MSL

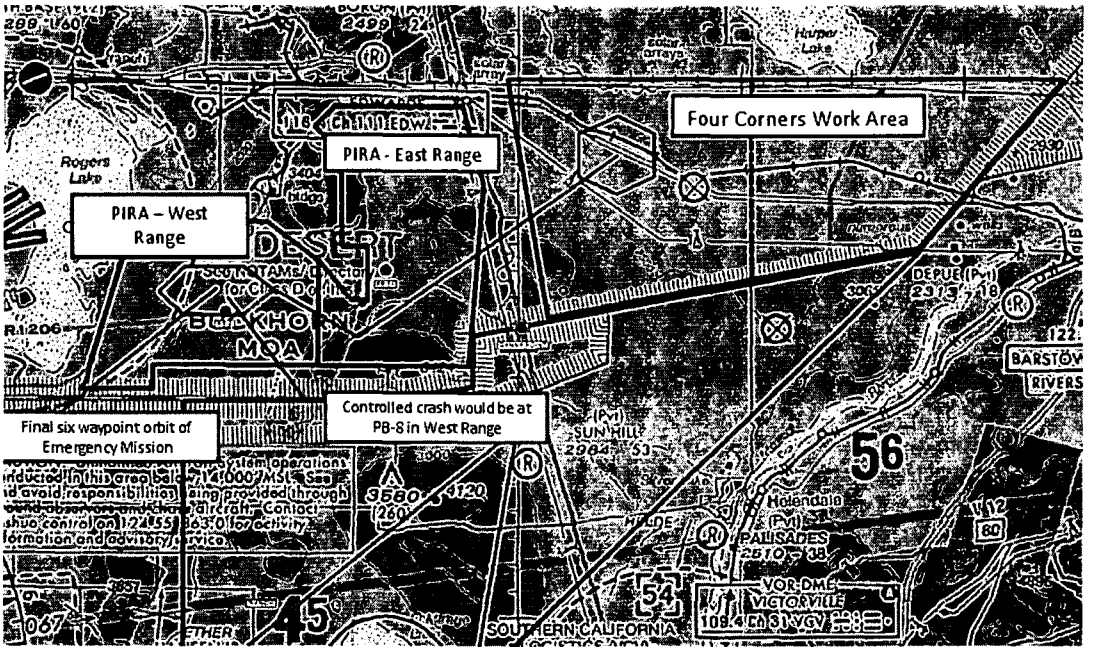

Figure 2. PIRA West Range and Four corners Work Area

d. Authorized flight times and conditions. All flight operations must be conducted during daylight hours under visual flight rules (VFR). It is recognized that General Atomics may be permitted to operate within Special Use Airspace (SUA) per authorization of the using agency. Under these circumstances, should the UA venture beyond the boundaries of the SUA (e.g., spill out), provisions of this experimental certificate shall apply, including authorization to only operate within the boundaries of the PCA. In these circumstances, General Atomics is responsible for notifying the FAA of the breach of any operations.

e. Criteria for remaining in the flight test area. The UAS PIC must ensure all UA flight operations remain within the lateral and vertical boundaries of the PCA. Furthermore, the UAS PIC must take into account all factors that may affect the capability of the UA to remain within the flight test area. This includes, but is not limited to, considerations for wind, gross weight, and glide distances.

f. Incident/accident reporting. Any incident/accident and any flight operation that transgresses the lateral or vertical boundaries of the flight test area or any restricted airspace must be reported to the FAA within 24 hours. This information must be reported to the Unmanned Aircraft Program Office, AFS-407. AFS-407 can be reached by telephone at 202-385-4636 and fax at 202-385-4651. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov. Further flight operations must not be conducted until the incident is reviewed by AFS-407 and authorization to resume operations is provided to GA-ASI.

4. UA Pilots and Observers.

a. UA PIC roles and responsibilities.

1) All flight operations must have a designated UA PIC. The UA PIC has responsibility over each flight conducted and is accountable for the UA flight operation.

2) The UA PIC must perform crew duties for only one UA at a time.

3) The UA PIC is responsible for the safety of the UA as well as persons and property along the UA flight path. This includes, but is not limited to, collision avoidance and the safety of persons and property in the air and on the ground. UAS pilots will ensure there is a safe operating distance between manned and unmanned aircraft at all times in accordance with 14 CFR 91.111, *Operating Near Other Aircraft*, and 14 CFR 91.113, *Right-of-Way Rules*. Additionally, UAS operations are advised to operate well clear of all known manned aircraft operations.

4) The UA PIC must avoid densely populated areas (§ 91.319) and exercise increased vigilance when operating within or in the vicinity of published airway boundaries.

b. UA PIC certification and ratings requirements.

1) UA pilots shall hold, at a minimum, an FAA Private Pilot certificate, Instrument Rating, Airplane category with Single or Multiengine class ratings, and have it in their possession.

2) The UA PIC must have and be in possession of a valid second-class (or higher) airman medical certificate issued under 14 CFR part 67, Medical Standards and Certification.

c. UA PIC currency, flight review, and training.

1) No person may act as pilot in command of an unmanned aircraft unless that person has made at least three takeoffs and three landings in manned aircraft within the preceding 90 days acting as the sole manipulator of the flight controls.

2) The UA PIC must maintain currency in unmanned aircraft in accordance with GA-ASI company procedures.

3) The UA PIC must have a flight review in unmanned aircraft every 24 calendar months in accordance with GA-ASI company procedures.

4) All UA PICs must have successfully completed applicable GA-ASI company training for the UAS.

5) Training of UA pilots shall be conducted by certified flight instructors (CFI) or ground instructors (GI). Required training and currency events shall be endorsed by the CFI/GI in company records and the pilot's logbook. Instructors shall follow the guidance specified in 14 CFR 61, Subpart H and Subpart I and shall maintain currency in accordance with these sections.

d. Supplemental UA pilot roles and responsibilities.

1) Any additional UA pilot(s) assigned to a crew station during UA flight operations will be considered a supplemental UA pilot.

2) A supplemental UA pilot assists the PIC in the operation of the UA and may do so at the same or a different control station as the PIC. The UA PIC will have operational override capability over any supplemental UA pilots, regardless of position.

3) A supplemental UA pilot must perform crew duties for only one UA at a time.

e. Supplemental UA pilot certification. Any supplemental pilot shall hold, at a minimum, an FAA Private Pilot certificate, Instrument Rating, Airplane category with Single or Multiengine class ratings, and have it in their possession.

f. Supplemental UA pilot currency, flight review, and training.

1) All UA pilots must maintain currency in unmanned aircraft in accordance with GA-ASI company procedures.

2) All UA pilots must have a flight review in unmanned aircraft every 24 calendar months in accordance with GA-ASI company procedures.

3) All UA pilots must have successfully completed applicable GA-ASI training for the UAS.

4) Training of UA pilots shall be conducted by certified flight instructors (CFI) or ground instructors (GI). Required training and currency events shall be endorsed by the CFI/GI in company records and the pilot's logbook. Instructors shall follow the guidance specified in 14 CFR 61, Subpart H and Subpart I and shall maintain currency in accordance with these sections.

g. Observer roles and responsibilities. The task of the observer is to provide the UA PIC with instructions to maneuver the UA clear of any potential collision with other traffic. To satisfy these requirements:

1) The observer must perform crew duties for only one UA at a time.

2) The UA must remain within a lateral distance of no more than 2.5 NM and 3,000 feet vertically from the visual observer. This is to ensure maneuvering information can be reliably determined.

3) An observer must maintain visual contact with the UA to discern UA attitude and trajectory in relation to conflicting traffic.

4) For the purpose of see-and-avoid, visual observers must be utilized at all times. The observers may either be ground based or in a chase plane. When a chase aircraft is used, it must maintain a reasonable proximity, and must position itself relative to the UA to reduce the hazard of collision in accordance with § 91.111, Operating near other aircraft. When the observer is located in a chase aircraft, the observer's duties must be dedicated to the task of observation only. Concurrent duty as pilot of the chase aircraft is not authorized.

5) Observers must continually scan the airspace for other aircraft that pose a potential conflict.

6) In order to comply with the see and avoid requirements of Title 14 Code of Federal Regulations §§ 91.113 and 91.111, the pilot-in-command and visual observers must be able to see the aircraft and the surrounding airspace throughout the entire flight; and be able to determine the aircraft's altitude, flight path and proximity to traffic and other hazards (terrain, weather, structures) sufficiently to exercise effective control of the aircraft to give right-of-way to other aircraft, and to prevent the aircraft from creating a collision hazard.

h. Observer certification.

1) All observers must either hold, at a minimum, an FAA private pilot license or military equivalent, or must have successfully completed specific observer training acceptable to the FAA. An observer does not require currency as a pilot.

2) All observers must have in their possession a valid second-class (or higher) airman medical certificate issued under part 67.

i. Observer training.

1) All observers must be thoroughly trained, be familiar with, and possess operational experience with the equipment being used. Such training is necessary for observation and detection of other aircraft for collision avoidance purposes as outlined in GA-ASI program letter.

2) All observers must have successfully completed applicable GA-ASI training for the UAS.

j. Training and currency records. The training and currency requirements for pilots and observers listed in this section must be documented by GA-ASI in the individual pilot/observers personnel records and made available for inspection upon request by the FAA.

5. Equipage.

a. The UAS shall be equipped with an operable Mode C or Mode S transponder and two-way communications equipment allowing communications between the UA pilot, chase aircraft, observers, all UAS control stations, and Air Traffic Control.

b. The UA and chase aircraft shall be equipped with operable navigation, position, and strobe/anti-collision lights.

6. Electronic Devices. The use of personal electronic devices (including cell phones) by crew members, other than for UA flight and mission requirements usage is prohibited.

7. Communications.

a. Before UA flights.

1) Before conducting operations, the frequency spectrum used for operation and control of the UA must be approved by the Federal Communications Commission or other appropriate government oversight agency.

2) ***Prior to flight, the UAS flight operations schedule for N188HK must be provided to Mr. Cotry Shearill, at email cotry.shearrill@faa.gov, at the Van Nuys FSDO.***

b. During UA fights.

1) Upon initial contact with ATC, the PIC must indicate the experimental nature of the aircraft in accordance with 14 CFR § 91.319.

2) The UA PIC must maintain two-way radio communication with ATC. In addition, if a chase aircraft is utilized, the chase aircraft pilot shall maintain two-way radio communication with the UA PIC and an active listening watch on the assigned ATC frequency. Should the UAS experience communication difficulty or failure, the chase aircraft will assume responsibility for two-way radio communication with ATC for the flight.

The UAS shall remain within 2.5 nm and 1500' AGL of the El Mirage or Gray Butte airport when conducting local traffic pattern operations and shall remain within the specified observer distances. While in the traffic pattern direct two-way radio communications with ATC are not required.

3) The PIC and observer(s) must maintain two-way communications with each other during all operations.

4) If communications cannot be maintained between the PIC, chase aircraft pilot, observer(s) and appropriate ATC facility, the UA will squawk 7600-transponder code, expeditiously return to its base of operations while remaining within the PCA, and conclude the flight operation.

5) If the chase aircraft is operating more than 100 ft above/below and or ½ nm laterally, of the UA, the chase aircraft PIC will advise the controlling ATC facility. The distances listed are the maximum; at no time will the UA be operated at a distance beyond the visual line of sight for the visual observer.

6) The UA PIC or chase plane PIC (whichever is applicable) will notify ATC of any in flight emergency or aircraft accident as soon as practical.

7) The PIC shall comply with all ATC instructions and/or clearances.

8. Flight Conditions.

a. Daylight operations. All flight operations must be conducted between official sunrise and sunset in visual meteorological conditions (VMC), including cloud clearance minimums as specified in § 91.155, Basic VFR weather minimums. Flight operation in instrument meteorological conditions (IMC) is not permitted.

b. General Atomics shall fax High Desert TRACON a daily squawk code request sheet to 661-258-4850 for local operations that will remain below 13,000' or that will operate in the R-2508 Complex. The daily squawk request shall be received by TRACON at least one hour prior to the first scheduled flight from either El Mirage or Grey Butte airport. If TRACON cannot accept the coordinated information, TRACON shall contact the appropriate user. The beacon code assignments are:

Call Sign Det 3	Transponder Code	Call Sign GA-ASI	Transponder Code
VEGAS01	5201	UAV11/DISCO11	5211
VEGAS02	5202	UAV12/DISCO12	5212
VEGAS03	5203	UAV13/DISCO13	5213
VEGAS04	5204	UAV14/DISCO14	5214
VEGAS05	5205	UAV15/DISCO15	5215
VEGAS06	5206	UAV16/DISCO16	5216
VEGAS07	5207	UAV17/DISCO17	5217

c. Prohibitions.

1) The UA is prohibited from aerobatic flight, that is, an intentional maneuver involving an abrupt change in the UA attitude, an abnormal acceleration, or other flight action not necessary for normal flight. (See § 91.303.)

2) The dropping or spraying of aircraft stores, or carrying of hazardous materials (included ordnance) is prohibited.

3) The UA may not be operated by more than one control station at a time, and the control station may not be used to operate multiple UA.

4) The UA PIC shall not accept any ATC clearance requiring the use of visual separation, sequencing or visual approach.

5) Flight in Reduced Vertical Separation Minima (RVSM) airspace is not authorized.

6) The UA shall not be operated (including lost link procedures) over congested areas, heavily trafficked roads, or an open-air assembly of persons.

7) Operations shall not loiter on Victor airways, Jet Routes, Q Routes, IR Routes, or VR Routes. When necessary, transit of airways and routes shall be conducted as expeditiously as possible.

8) Operations shall be conducted under VFR rules only and shall operate at appropriate VFR altitudes for direction of flight (14 CFR 91.159). IFR operations are not authorized.

9) All operators that use GPS as a sole source, must check all NOTAM's and Receiver Autonomous Integrity Monitoring (RAIM). Flight into GPS test area or degraded RAIM is prohibited,.

(10) At no time will TCAS be used in any mode while operating an unmanned aircraft.

d. Transponder requirements.

1) The UA must operate an altitude encoding transponder, Mode C or Mode S, in accordance with applicable guidelines and procedures.

2) Chase aircraft transponders must be on standby while performing chase operations flight with the UA unless otherwise directed by ATC.

e. Transponder failure.

1) In the event of transponder failure on either the UA or the chase aircraft, the UA must conclude all flight operations and expeditiously return to its base of operations within the prescribed limitations of this authorization.

2) In the event of UA transponder failure, a chase aircraft will operate its transponder in Mode C.

9. Flight Termination and Lost Link Procedures.

a. Flight termination. Flight operations must be discontinued at any point that operation within the approved flight area(s) is breached or the UA can no longer be operated in a safe manner.

b. Lost link procedures. In the event of a lost link, the UAS pilot squawk 7600 and will immediately notify High Desert TRACON (E10) at (661) 277-3843, state pilot intentions, and comply with the following provisions:

1) If the UA is operating between the R-2508 Complex and El Mirage or Gray Butte Flight Test Facilities, the UA will remain within the approved local operations airspace, and fly back to the departure airfield (either El Mirage or Gray Butte), and orbit within 2.5 NM for the Predator B.

2) Once established in the lost link orbit pattern around either El Mirage or Gray Butte Flight Test Facilities, when command link can be restored, recovery of the aircraft will occur unless mission continuation is authorized by ATC.

3) If lost link occurs while operating within restricted area R-2508, the UAS will fly the flight plan route to the established lost link area within the R-2508 restricted airspace (either in PIRA West or Four Corners Work Area). Once established in the lost link pattern, when command link can be restored, recovery of the aircraft will occur unless mission continuation is authorized by ATC.

4) An aircraft that enters lost link in the Edwards range would initially hold in a loiter as indicated in the western half of the Four Corners work area. After generally 30 minutes it would proceed along the Emergency Mission ultimately orbiting in the West Range until C2 link with the aircraft was recovered or the aircraft ran out of gas. The aircraft would continue to fly the ground track of the final orbit until impacting the ground.

5) In the event of an in-flight emergency that was deemed too risky to return to Gray Butte or El Mirage, an attempt to land on the dry lake bed could be made. If a controlled crash were required it would be accomplished at PB-8 on the West Range.

c. The software for the aircraft lost link timer shall be set to 3 hours. If aircraft control cannot be re-established within 3 hours, the aircraft shall execute a controlled descent to the ground.

10. Maintenance and Inspection.

a. General requirements. The UAS must not be operated unless it is inspected and maintained in accordance with the General Atomics CAPITAL REAPER MAINTENANCE AND INSPECTION PROGRAM, ASI-02174 dated 09/02/08 for the UA, and ASI-02208 for the GCS dated 09/17/08, or later FAA approved revision. GA-ASI must establish and maintain aircraft maintenance records (see paragraph 10(d) below).

b. Inspections. No person may operate this UAS unless within the preceding 12 calendar months it has had a condition inspection performed according to the FAA approved General Atomics CAPITAL REAPER MAINTENANCE AND INSPECTION PROGRAM, ASI-02174 dated 09/02/08 for the UA, and ASI-02208 for the GCS dated 09/17/08, or later FAA approved revision. The UAS must also have been found to be in a condition for safe operation. This inspection will be recorded in the UAS maintenance records as described in paragraph 10(d) below.

c. Authorized inspectors. Only those individuals trained and authorized by GA-ASI and acceptable to the FAA may perform the inspections and maintenance required by these operating limitations.

d. Maintenance and inspection records. Maintenance and inspections of the UAS must be recorded in the UAS maintenance records. The following information must be recorded:

1) Maintenance record entries must include a description of the work performed, the date of completion for the work, the UAS total time-in-service, and the name, signature, and certificate number of the person accepting the work performed.

2) Inspection entries must contain the following, or a similarly worded, statement: *I certify that this UAS was inspected on (date), in accordance with the scope and detail of*

the GA-ASI Inspection and Maintenance Program, and was found to be in a condition for safe operation.

3) UAS instruments and equipment required to be installed must be inspected and maintained in accordance with the requirements of the General Atomics CAPITAL REAPER MAINTENANCE AND INSPECTION PROGRAM, ASI-02174 dated 09/02/08 for the UA, and ASI-02208 for the GCS dated 09/17/08, or later FAA approved revision. Any maintenance or inspection of this equipment must be recorded in the UAS maintenance records.

4) No person may operate this UAS unless the altimeter system and transponder have been tested within the preceding 24 calendar months in accordance with § 91.411, Altimeter system and altitude reporting equipment tests and inspections, and § 91.413, ATC transponder tests and inspections. These inspections will be recorded in the UAS maintenance records.

11. Information Reporting. General Atomics shall provide the following information to donald.e.grampp@faa.gov on a monthly basis.

a. Number of flights conducted under this certificate.

b. Pilot duty time per flight.

c. Unusual equipment malfunctions (hardware or software).

d. Deviations from ATC instructions.

e. Unintended entry into lost link flight mode that results in a course change.

12. Revisions and Other Provisions.

a. Experimental certificates, program letters, and operating limitations. The experimental certificate, FAA-accepted GA-ASI program letter, and operating limitations cannot be reissued, renewed, or revised without application being made to the Los Angeles Manufacturing Inspection District Office (LA MIDO), in coordination with AIR-200. AIR-200 will be responsible for FAA Headquarters internal coordination with the Aircraft Certification Service, Flight Standards Service, Air Traffic Organization, Office of the Chief Council, and Office of Rulemaking.

b. Certificates of waiver or authorization. GA-ASI shall immediately notify the Production and Airworthiness Division, AIR-200, and the LA MIDO, if there is any plan for requesting a Certificate of Authorization or Waiver (COA) for UAS operations during the time the experimental certificate is in effect. An entry in the aircraft logbook is required to document that the aircraft flight authority has been changed from the experimental certificate to COA. When COA operations are concluded and the aircraft resumes flying under the experimental certificate, a record entry will be made in the aircraft logbook by an appropriately rated person to document that the aircraft is in a condition for safe operation and appropriately configured.

c. Amendments and cancellations. The provisions and limitations annotated in this operational approval may be amended or cancelled at any time as deemed necessary by the FAA.

d. Reviews of revisions. All revisions to GA-ASI FAA-approved Maintenance and Inspection Program must be reviewed and approved by the Van Nuys Flight Standards District Office.

13. UAS Modifications.

a. Software and system changes. All software and system modifications will be documented as part of the normal maintenance procedures and will be available for inspection. All software and system modifications must be inspected and approved in accordance with the General Atomics CAPITAL REAPER MAINTENANCE AND INSPECTION PROGRAM, ASI-02174 dated 09/02/08 for the UA, and ASI-02208 for the GCS dated 09/17/08, or later FAA approved revision. All software modifications to the aircraft and control station are categorized as major modifications, and must be provided in summary form at the time they are incorporated.

b. Major modifications. All major modifications, whether performed under the experimental certificate, COA, or other authorizations, that could potentially affect the safe operation of the system, must be documented and provided to the FAA before operating the aircraft under this certificate. Major modifications incorporated under COA or other authorizations must be provided only if the aircraft is flown under these authorizations during the effective period of the experimental certificate.

c. Submission of modifications. All information requested must be provided to AIR-200.

End of Limitations

6/30/2011
Date

Richard Schoenberger
Aviation Safety Inspector (Mfg)
Los Angeles Manufacturing Inspection District Office
3960 Paramount Blvd.
Lakewood, CA 90712

I certify that I have read and understand the operating limitations and conditions that are a part of the special airworthiness certificate, FAA Form 8130-7, issued on 06/30/2011 for the purposes of research and development, market survey, and/or crew training.

This special airworthiness certificate is issued for the Predator B model UHK97000-10 UAS, serial number FC188, registration number N188HK.

6/30/2011
DateName

Applicant (signature)
Gary Bender
Director, Flight Operations
General Atomics, Aeronautical Systems Incorporated

PROGRAM LETTER

for

General Atomics Aeronautical Systems, Inc. (GA-ASI)

Predator B Special Airworthiness Certificate (Experimental)

Date: June 10, 2011

REPORT NUMBER:	ASI-04204
TITLE:	Program Letter for Predator B Special Airworthiness Certificate
PROGRAM:	Predator B Experimental Certification Modification Program

REPORT NUMBER: ASI-04204

TITLE: Program Letter for Predator B Special Airworthiness Certificate

PROGRAM: Predator B Experimental Certification

Approved by: /signed/ William L. Cone

William L. Cone
Capital Predator B, Program Manager

REVISION LOG							
Rev Letter	Date	Revised By	Approved By	Pages Affected	Removed	Added	Remarks
A	6/10/11	-	W.L. Cone	-	-	-	Initial Release

GA-ASI PROGRAM LETTER FOR PREDATOR B UNMANNED AIRCRAFT SYSTEM (UAS), SPECIAL AIRWORTHINESS CERTIFICATE

REGISTERED OWNER NAME: General Atomics Aeronautical Systems Inc. **REGISTERED OWNER ADDRESS:** 14200 Kirkham Way Poway, Ca 92064 **AIRCRAFT DESCRIPTION:** Predator B Unmanned Aircraft **AIRCRAFT REGISTRATION:** N188HK	**AIRCRAFT BUILDER:** General Atomics Aeronautical Systems Inc. **YEAR MANUFACTURED:** 2010 **AIRCRAFT SERIAL NUMBER:** FC188 **AIRCRAFT MODEL DESIGNATION:** PREDATOR B, UHK97000-10 **ENGINE MODEL:** Honeywell TPE331-10YGD-514GA **PROPELLER MODEL:** McCauley X3GFR36C606/110GFA-0

1. DEFINE THE EXPERIMENTAL PURPOSE(S) UNDER WHICH THE AIRCRAFT IS TO BE OPERATED (14 CFR § 21.191):

1.1 General Atomics Aeronautical Systems Inc. (GA-ASI) requests an Experimental Certificate to conduct flight operations under (14 CFR § 21.191(a), (c) & (f)) of our Predator B Unmanned Aircraft System (UAS) at our Gray Butte and El Mirage Flight Operation Facilities for the following purposes:

1.1.1 Research and Development - Testing new aircraft design concepts, new aircraft equipment, new aircraft installations, new aircraft operating techniques, or new uses for aircraft.

1.1.2 Crew Training - Training of our flight crews.

1.1.3 Market Survey – Use the aircraft to conduct market surveys or sales demonstrations.

2. DESCRIBE THE PURPOSE / SCOPE OF THE EXPERIMENTAL PROGRAM FOR EACH 14 CFR § 21.191 EXPERIMENTAL PURPOSE SOUGHT (14 CFR § 21.193 (a),(b)&(d))

2.1 GA-ASI requests an experimental certificate for Predator B for operating the UAS at our Flight Operations Facilities for the following purposes:

2.1.1 Company Research and Development Flights – The Capital Predator B system will be used for continued verification of the system performance envelope, and to test / verify enhancements and upgrades proposed for the system. Performance evaluations may be conducted with the aircraft in both the clean wing and captive carry weapons configurations. The captive carry "weapons" will be inert mass simulators. No launches or releases of weapons / stores will be conducted from the Capital Predator B aircraft. During captive carry flights, all carriage and release equipment will be pinned to prevent release of stores. Additionally, this aircraft will be used to test various maritime radars and for this reason will need to operate over water.

2.1.2 Crew training – GA-ASI desires to employ the Predator B for crew training of company personnel.

2.1.3 Market Surveys – GA-ASI plans to demonstrate the Predator B capability to operate various maritime radars to various potential customers.

2.2 Detailed information required by 14 CFR § 21.193 (b) & (d) is provided in the following paragraphs.

3. DEFINE THE AREA(S) IN WHICH THE EXPERIMENTAL FLIGHTS WILL BE CONDUCTED:

3.1 Address of Base of Operation: Operations will be conducted from the GA-ASI flight operations facilities located at Gray Butte and El Mirage, CA.

3.1.1 Gray Butte Flight Test Facility
25500 East Avenue R-8
Palmdale, CA 93550
(661) 233-6000

3.1.2 El Mirage Flight Test Facility
73 El Mirage Airport Road – Suite B
Adelanto, CA 92301
(760) 388-8100

3.2 Special Provisions - Predator B will be operated in accordance with the special provisions specified below.

3.2.1 Predator B operations will be conducted in Visual Meteorological Conditions (VMC). Predator B shall follow FAR Part 91 cloud clearance requirements.

3.2.2 Flight operations will not be conducted in the Victorville (KVCV) Class D airspace.

3.2.3 Predator B UAS flight operations will be conducted in accordance with Visual Flight Rules (VFR) and with an appropriately equipped chase aircraft below 13,000 feet MSL in the following Primary Containment area and within the noted coordinates in Table 1.

	Latitude	Longitude
SW	34°30'00"N	117°45'30"W
NW	34°48'00"N	117°45'30"W
N1	34°48'00"N	117°35'03"W
N2	34°48'30"N	117°32'03"W
N3	34°50'15"N	117°32'03"W
NE	34°53'20"N	117°11'53"W
E1	34°39'00"N	117°30'00"W
SE1	34°34'00"N	117°30'00"W
SE2	34°30'00"N	117°37'00"W

Table 1: Primary Containment Area Coordinates

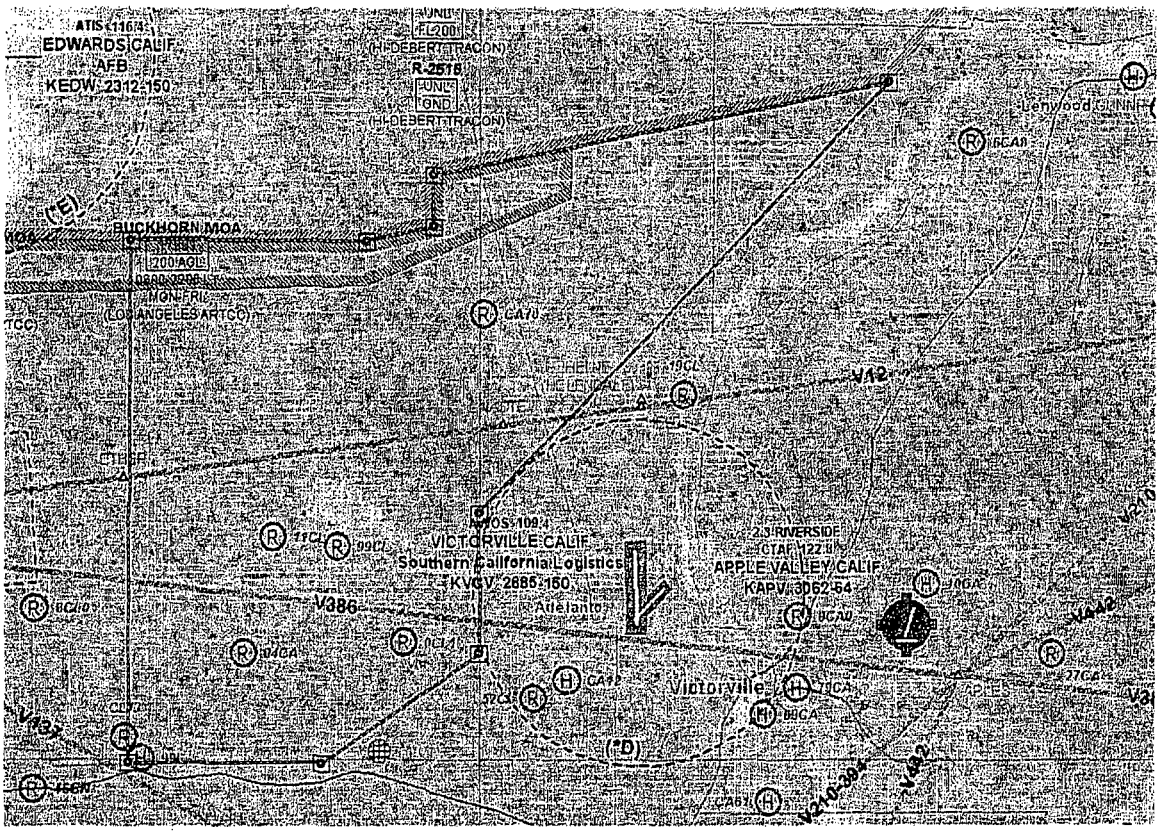

Figure 1: Primary Containment Area (WAC Depiction)

3.2.4 During UAS operation, two-way radio communication will be maintained between the UAS pilot/operator, chase plane and the appropriate FAA Air Traffic controlling facility. If communication cannot be maintained by the UAS pilot / operator, chase plane or the appropriate FAA Air Traffic controlling facility, the UAS will expeditiously return to its base of operations and the flight will be terminated.

3.2.5 The UAS and the chase plane will have position and strobe lights on at all times. If any of these systems on either aircraft are inoperative the flight will be cancelled.

3.2.6 GA-ASI, and/or its representatives are responsible at all times for collision avoidance with non-participating aircraft and the safety of persons or property on the surface with respect to the Predator B.

3.2.7 From sunrise to sunset (daytime), UAS operations may be conducted from the surface (3,020') to 6,000 feet mean sea level (MSL), with the Predator B operator and a ground observer, who is in direct communication with the UAS operator, assisting in see-and-avoid duties for the UAS. The ground observer is responsible for maintaining visual contact with the aircraft at all times. At no time will the aircraft exceed 2.5 nautical miles (nm) from the ground observer.

3.2.8 Operations above 13,000 feet MSL and/or outside the area described in paragraph 3.2.3 shall require an Instrument Flight Rules (IFR) flight plan and a chase aircraft in direct communication with Los Angeles Air Route Traffic Control Center (ZLA) or the appropriate controlling Center. Predator B flights may be conducted in Class A airspace (above 18,000 feet) without a chase plane and will require an IFR flight plan and direct communication between the Predator B operator and ZLA. When operating on a flight plan and under positive control, all ATC instructions shall be adhered to.

3.2.9 Predator B UAS operations may be conducted in VFR conditions in the Barstow, Isabella, Owens, Saline, and Panamint Military Operating Areas (MOA) with permission of the controlling agencies. The Predator B shall be accompanied by a chase plane when operating in MOAs.

3.2.10 High Desert TRACON (Joshua Approach) may provide traffic advisories to the chase aircraft during the UAS operation. In the event that controller workload prohibits this service, or two-way radio communications cannot be maintained, the Predator B operation shall be canceled.

3.2.11 GA-ASI will coordinate each UAS flight with High Desert TRACON two (2) hours prior to the operation for transponder codes. The chase aircraft transponder will be on standby while in formation with the Predator B, but shall be turned on when separated. The Predator B transponder will be turned on and set to the ATC assigned code any time the Predator B is operating. In the case of a transponder

failure on either the Predator B or the chase aircraft, the Predator B operation shall be terminated.

3.2.12 GA-ASI will contact Prescott (PRC), AZ Automated Flight Service Station (AFSS) HUB facility at 877-487-6867, at least twenty-four hours prior to each event to issue a Notice to Airmen (NOTAM). GA-ASI will provide the location, altitude, and times of operation as a minimum. The center of the operating area may be described using either the Palmdale VOR (PMD) or Victorville VOR (VCV). GA-ASI will provide PRC AFSS any additional information requested for NOTAM purposes.

3.2.13 All Predator B pilot in command (PIC) will hold, as a minimum, a valid FAA commercial pilot certificate with an instrument rating. The Predator B operator shall control only one UAS at any one time. The chase aircraft or ground observer will perform see and avoid duties for the UAS.

3.2.14 All Predator B operations will be performed under the established GA-ASI inspection and maintenance procedures.

3.2.15 Predator B operations will be performed under our established quality management system for engineering, production, delivery, servicing, and ground and flight operations in a manner that is continually surveyed and acceptable in accordance with established GA-ASI procedures.

3.2.16 Research and development flight testing will be conducted according to our company Flight Readiness Review process which establishes that the Predator B is flight ready and suitable for safe operation.

3.2.17 The Predator B UA will not perform any aerobatic maneuvers and will adhere to the minimum fuel requirements contained in 14 CFR 91.151.

3.2.18 Program Summary

Estimated Flight Hours	300 hours
Estimated Number of Flights	90 flights
Duration	1 year

Table 2: Capital Predator B Program Summary

4. AIRCRAFT CONFIGURATION

4.1 The GA-ASI Predator B Unmanned Aircraft (UA) is manufactured by General Atomics Aeronautical Systems, Inc., in Poway, California. The Predator B UA is the airborne element of the MQ-9 Reaper Unmanned Aircraft System (UAS) currently being produced for the US Air Force. The complete system is comprised of multiple Predator B aircraft, a Ground Control Station (GCS), a C-band Line of Site (LOS) communications system, a Ku-band Satellite Communications (SATCOM) terminal,

and a compliment of support equipment. Figure 3 shows a typical Predator B UAS system architecture.

The Predator B aircraft is a Remotely Piloted Aircraft (RPA) controlled by a pilot who is located in the GCS. A pair of cameras, mounted in the nose of the aircraft provide, the pilot with a forward view using either daylight television or infrared (IR) images. Control commands are transmitted from the GCS to the aircraft by a ground-based datalink terminal.

The GCS incorporates workstations that allow operators to plan missions, control and monitor the aircraft, payload sensors and weapons, and exploit received images. The C-band communications system provides LOS control of the aircraft via C-band data link during launch and recovery operations and in support of local area flight operations. The Ku-band SATCOM system provides over-the-horizon control of the aircraft via Ku-band datalink and enhances the voice/data communication capabilities of the GCS.

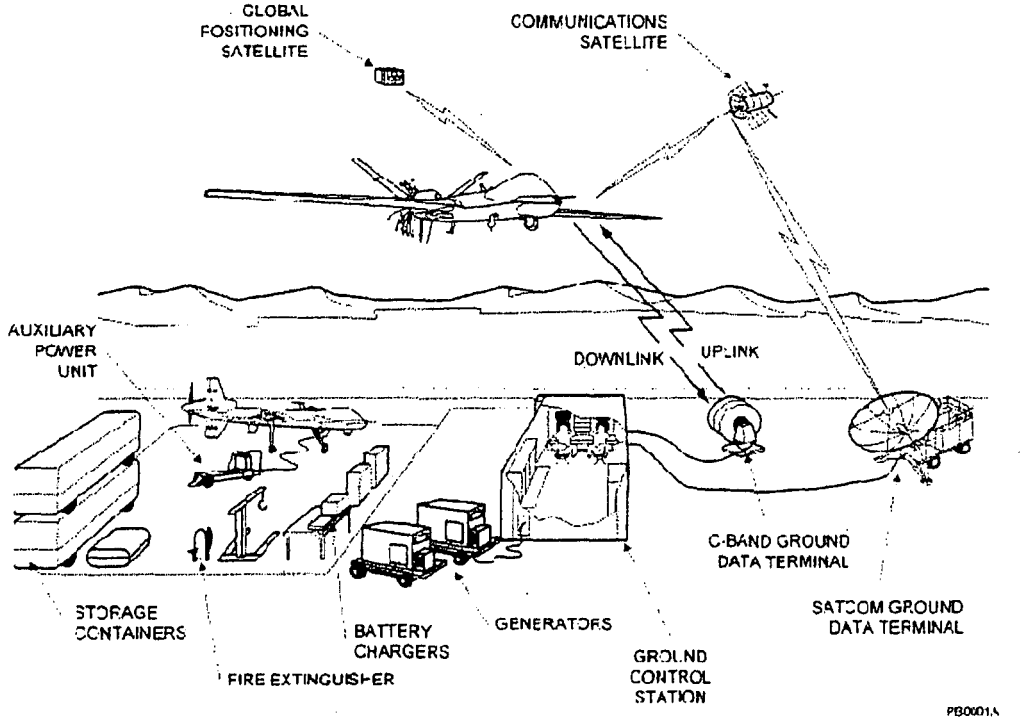

Figure 2: Typical Predator B UAS System Architecture

The aircraft is a long-endurance, high-altitude RPA designed for surveillance, military reconnaissance, targeting, and ground attack missions. The aircraft is a mid-wing monoplane with slender fuselage, high aspect ratio wing, V-tails, ventral fin

and rudder. It has retractable tricycle landing gear and is powered by a rear mounted turboprop engine driving a three-blade variable pitch propeller.

PREDATOR B Capabilities:

- Electro Optical / Infrared (EO/IR) payload
- Synthetic Aperture Radar (SAR) all-weather payload
- Maritime radar payload
- ESM payload capacity
- Satellite communications
- Line of sight communications
- GPS and INS
- UHF/VHF voice
- Over 30 hour on-station endurance
- Operations up to 50,000 feet MSL
- 800 lb internal payload capacity
- 3,000 lb external payload capacity
- 6 wing stations and 1 centerline station for external carriage of payloads
- Digital Electronic Engine Control (DEEC) System

The following figure provides identification of the Predator B aircraft:

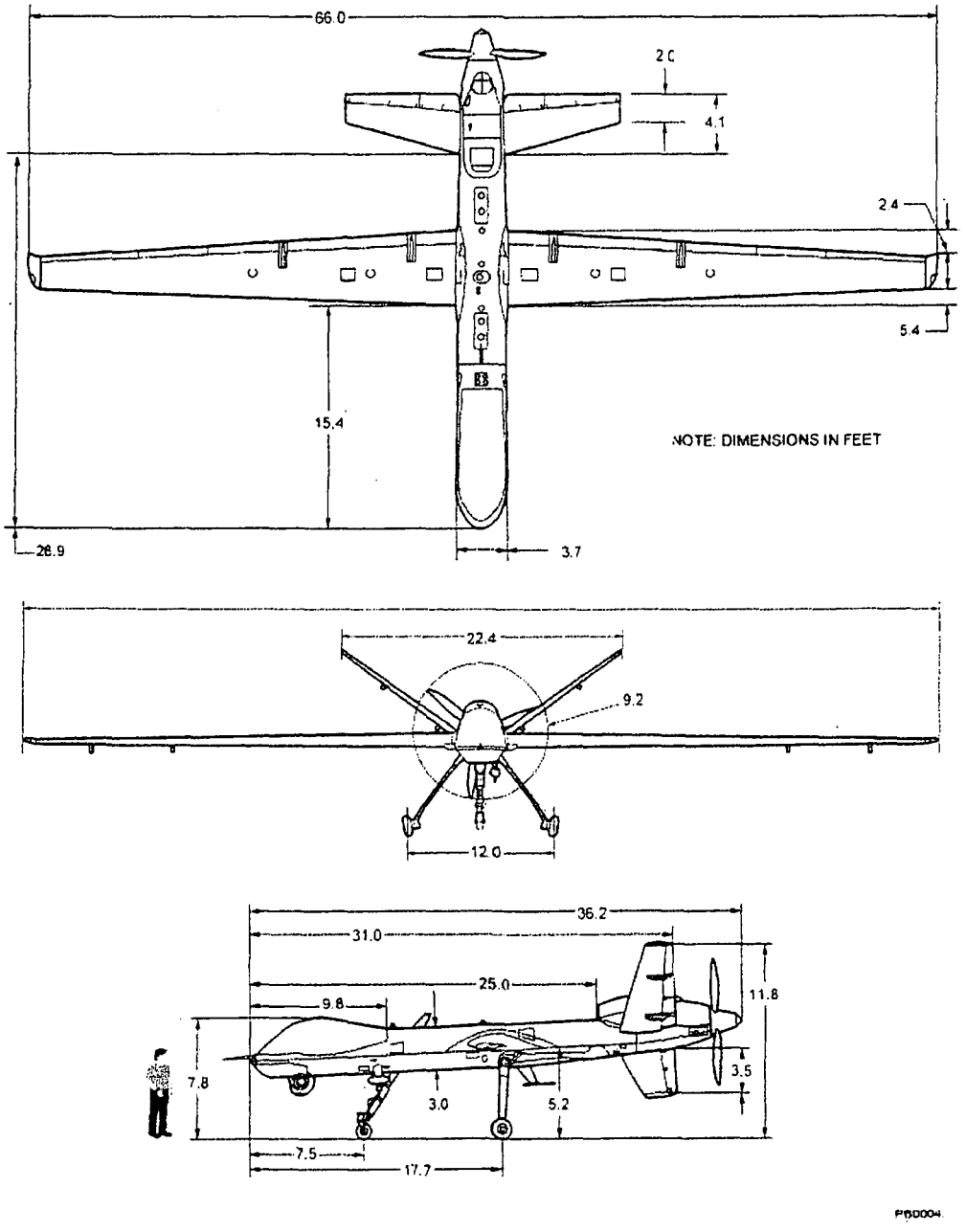

Figure 3: Predator B 3-View with Dimensions

The aircraft is powered by a Honeywell TPE331-10YGD-514GA turboprop engine outfitted with a Digital Electronic Engine Control (DEEC) system. The engine is mounted at the rear of the fuselage in a pusher configuration. The TPE331-10 engine is a single shaft design that incorporates a two stage centrifugal compressor with an annular combustion chamber, and a three-stage axial turbine.

Approximately two-thirds of the mechanical shaft power produced by the engine is used to rotate (drive) the compressor. The reduction gearbox converts the remaining high-speed/low-torque energy needed to drive the propeller and engine accessories.

ENGINE SPECIFICATIONS:

Manufacturer: Honeywell (Formerly Allied Signal / Garrett)
Model Number: TPE331-10YGD-514GA
Dry weight: 425 lb
Installed weight with propeller: 560 lb
Reduction gearbox: 26:1
Rated Horsepower: 900 SHP
Jet thrust: 157 lb Max Continuous
Total takeoff thrust: 2000 lb (standard day, sea level)
Reverse thrust: 700 lb (standard day, sea level)
Rated RPM: 41,730 Max Continuous
Propeller shaft RPM: 1591 Max Continuous
Specific Fuel Consumption: 0.55 lb/hp/hr
Fuel Grade: ASTM D1655-68T Types Jet A, Jet B, Jet A-1, JP-4, and JP-8
Oil Type: Exxon / BP Turbine Oil 2380 (Type II)

PROPELLER SPECIFICATIONS:

A three-blade, variable pitch propeller is installed with the blade profile and pitch range optimized for high altitude operation in a pusher configuration.

Manufacturer: McCauley Propeller Systems
Model Number: X3GFR36C606/110GFA-0
No. of Blades: Three
Pitch Mechanism: Hydro-mechanical governor
Diameter: 110 inches
Pitch Range: -15 to +90 degrees

4.1.1 The Predator B max GTOW is 10,500 lbs.

4.1.2 The Predator B aircraft carries up to 3900 lbs of useable fuel
4.1.3 The aircraft can be configured for multi-purpose medium to high altitude Intelligence, Surveillance & Reconnaissance (ISR) missions as well as "Hunter-Killer" missions.

4.1.4 The Predator B can carry up to 3000 lbs of external stores on seven~~six~~ (7~~6~~) hard points located three (3) on each wing and one (1) centerline hardpoint. The

aircraft is capable of carrying up to 1500 lbs payload on each inboard wing station; 750 lbs on each mid wing station, 150 lbs on each outboard wing station and 750 lbs on the centerline station. The Predator B external payload configuration is shown below in Figure 5.

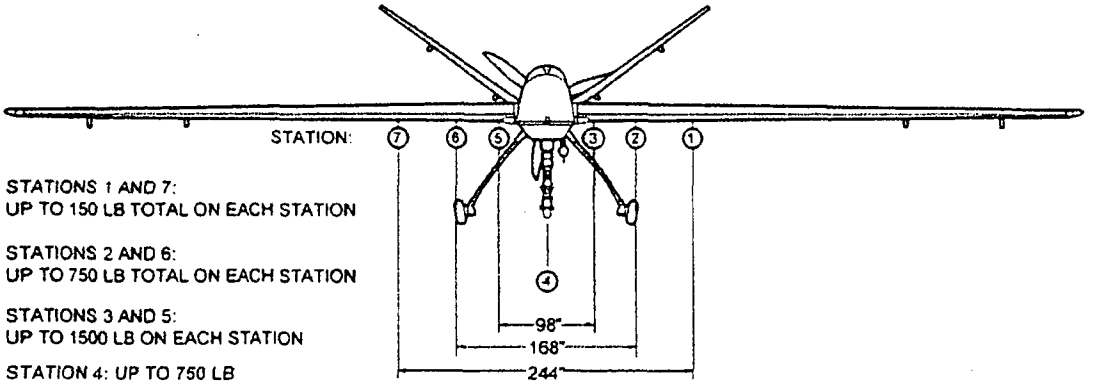

Figure 4: Predator B External Stores Configuration

4.1.5 The service ceiling for the Predator B is reduced to 25,000-30,000 feet MSL depending on the external configuration at max GTOW.

4.1.6 The maximum total endurance for the Predator B is over 30 hours in a clean wing configuration. Endurance is decreased with external stores due to increased drag and off-loading of fuel.

4.1.7 The maximum airspeed of the aircraft with full mission fuel is 230 knots.

4.1.8 The Data Link Subsystem is the same communications systems as is currently operational with the MQ-1 Predator and MQ-9 Reaper aircraft. The aircraft can be controlled from the ground via two modes of communication: Line-of-Sight (LOS) or SATCOM Beyond Line-of-sight (BLOS). LOS operates in the C-band while SATCOM operates in the Ku-band.

4.1.9 The Predator B aircraft design incorporates a significant level of redundancy. The aircraft is controlled by the Redundant Control Module (RCM) which houses a triple redundant flight control computer system. Flight control is conveyed over a dual redundant data bus. Aircraft electrical power is provided by a dual redundant 28 VDC power bus system. Predator B's primary navigation suite consists of three (3) flight certified Honeywell H764 EGIs (Embedded GPS / INS) with Trimble Force 5 Precise Positioning System GPS. The aircraft flight control surfaces are dual redundant and the aircraft employs a triple redundant air data system with heated pitot probes and heated static pressure ports.

The existing autopilots include point navigation, hold loiter, flight plan, and engineering test/manual control modes which build on basic stability augmentation control loops. The Predator B navigation sensors provide reliable, high accuracy velocity, heading, and position data for vehicle flight and navigation functions as well as supporting the precision mission requirements of surveillance and location.

5. INSPECTION AND MAINTENANCE (14 CFR § 91.7)

5.1 All Predator B operations will be performed IAW established GA-ASI inspection and maintenance procedures.

6. PILOT QUALIFICATION (14 CFR § 61.3, 61.5)

6.1 Pilot qualification and flight review will be conducted IAW company procedure ASI - 03938~~-00009~~. All GA-ASI pilots are required to possess at least an FAA commercial certified pilot certificate with instrument rating. All GA-ASI pilots are required to successfully complete a formal company training program for the company aircraft type (ex. Predator A, Predator B, etc.) Company training incorporates class instruction, simulation, and flight training. All GA-ASI pilots are required to maintain flight proficiency, complete annual oral and written exams, and pass an annual flight evaluation. All GA-ASI pilots are required to maintain instrument currency in manned aircraft.

7. AIRCRAFT MARKINGS (14 CFR Part 45)

7.1 An aircraft registration number: N188HK

7.2 The aircraft will be outfitted with external identification / markings in accordance with 14 CFR § 45.

8. ATC TRANSPONDER AND ALTITUDE REPORTING SYSTEM EQUIPMENT AND USE (14 CFR § 91.215)

8.1 The Predator B unmanned aircraft system will have an altitude reporting transponder capable of Mode S.

9. METHOD FOR SEE AND AVOID (14 CFR § 91.113a)

9.1 The pilot in command of the Predator B UA is responsible for seeing and avoiding other traffic using real time video image displays coming from: a) either of the two fixed forward-looking nose cameras, configured as two 30°FOV EO or one EO plus a Mid range FLIR (40°FOV), or b) the EO/IR turreted surveillance camera system (3 sensors with Field Of Regard covering full 360° of lower hemisphere plus above horizon capability for the forward viewing perspective in the region of +10°).

9.2 To assist the pilot, an observer either in a chase plane or on the ground will be used. These observers will maintain real time audio contact with the pilot.

The task of the observer is to provide the pilot of the UAS with advisory information to enable the pilot to maneuver the UAS clear of any other traffic. At no time shall visual observers conduct their duties more than 2.5 nm laterally or 3000 feet vertically from the UA. When a chase aircraft is utilized, it must maintain a reasonable proximity, and shall position itself relative to the UAS in such a manner to reduce the hazard of collision per 14 CFR § 91.111.

9.3 UAS pilots and observers shall perform crew duties for only one UAS at a time. Observer's duties shall be dedicated to the task of observation only, concurrent duty as a pilot is not authorized. Ground observers are trained in Right-of-Way Rules (14 CFR § 91.113) and Operating near Other Aircraft (14 CFR § 91.111) per the "A & P Training Program / Flight Operations Support Training" document.

10. SAFETY RISK MANAGEMENT

10.1 The FAA Safety Checklist shall be submitted for consideration 30 days prior to meeting with the FAA.

11. SYSTEM CONFIGURATION

The Predator B UA System is designed with the following elements:

11.1 Redundant Control Module (RCM):

- RCM processor and Input/Output (I/O) technology, implemented within its triplex architecture, using three independent flight computers.
- Dual independent voter circuits, each connected to all three processors and a dedicated UARB network.
- An independent power supply for each flight computer.
- The RCM also accommodates video switch circuitry to support the dual redundant nose cameras plus the video paths from the optional EO/IR payload sensor suite.

11.2 Aerodynamic Control Surfaces:

The Predator B is designed with redundant control surfaces

- Four aileron panels, two on each wing
- Four trailing edge flap panels, two on each wing
- Four ruddervator panels, two on each diagonal tail surface
- One rudder on the ventral fin.

Each of the thirteen (13) control surfaces is actuated by a DC brushless "smart" servo. These servo actuators are commanded via dedicated dual redundant serial buses that convey control surface commands from the triplex redundant flight computer RCM. Each servo assembly employs a microcontroller with dedicated microprocessor failure detection that defaults to pre-programmed state, when detected, to minimized aerodynamic effects (disconnect input drive, set to failure mitigating position).

11.3 Datalink:

The datalink consists of a radio frequency uplink and downlink which establish full duplex communication between the airborne datalink terminal in the aircraft and the ground-based datalink terminals associated with the GCS. A continuous stream of control commands is transmitted to the aircraft, and the aircraft transmits a continuous stream of status and imagery data to the GCS.

The datalink can be maintained by a C-band LOS datalink system or a Ku-band SATCOM datalink system. Aircraft control commands are entered from Pilot/Sensor Operator (PSO) workstations inside the GCS. These commands are routed to the selected GDT where they are incorporated into the uplink or command link.

The aircraft receives commands and routes them to the aircraft Redundant Control Module (RCM) for execution. The RCM also receives reconnaissance sensor imagery and telemetry data from aircraft subsystems. The RCM processes this data and incorporates it into the Ku-band Return Link (RL) or LOS downlink. The GDT receives the LOS downlink, processes the data, and routes it to the GCS for display on PSO workstations, while the Ku-band system receives the return link and routes it to the GCS for processing and display. For maintenance purposes, a direct connect capability is provided that allows the datalink to be established via an interconnect cable between the GCS and the aircraft versus the normal RF mode of operation.

11.4 Communication:

The Predator B system utilizes an ARC-210 UHF/UHF communications radio installed in the aircraft. This equipment is controlled from the GCS by on-screen commands with six selectable frequency bands available as shown in the table below. The operator(s) can communicate with Air Traffic Control (ATC) when using the 108.000 MHz thru 117.975 MHz AM band.

Frequency	Band
30.000 to 87.975	FM
108.000 to 117.975	AM
118.000 to 135.975	AM
136.000 to 155.975	AM / FM

156.000 to 173.975	FM
225.000 to 399.975	AM / FM

Table 3: ATC Radio Frequencies and Bands

11.5 Aircraft Electrical Power:

The Predator B's electrical power system distributes 28 VDC power to all aircraft electrical / electronic components. The system includes an engine driven starter/generator, a dual redundant power bus, and batteries for backup power.

11.6 Navigation Sensor Suite:

The navigation sensor suite employs three (3) flight certified Honeywell H-764 EGIs (Embedded GPS / INS) with Trimble Force 5 Precise Positioning System GPS. The resulting three strings of sensor data are used for flight control and stabilization together with the navigation duties. The triple string of data is conveyed to the triple redundant RCM and voted and selected using techniques implemented and flying on Altair and Predator B aircraft.

11.7 Ground Control Station:

GA-ASI Ground Control Station (GCS) is common to all GA-ASI Predator aircraft. Aircraft type differences are accommodated through matching of tail number and system configuration ID resident in aircraft and GCS S/W. This approach circumvents a GCS controlling an aircraft with a different setup (i.e. piston engine controls versus turbine). Multiple GCSs at both GA-ASI Gray Butte and El Mirage, California flight test center facilities provide multiple GCS backup options. The capital Predator B aircraft will be flown from a fixed GCS which is backed up by an emergency generator in case of a power failure.

12. SYSTEM SAFETY - FLIGHT TERMINATION AND LOST LINK

The Predator B system redundancy maintains a high level of UAS operational integrity permitting continued control and safe piloting of the UAS throughout its mission, from launch through to recovery. This is the principal means of maintaining containment of operations within the agreed locations and altitudes of the Experimental Certification limitations. To address failures that cannot be assured to maintain containment, there are several Flight Termination modes embedded within the Predator B system to address these.

12.1 Pilot controlled descent and touch down: This may be used with engine out when beyond glide range of either the El Mirage or Grey Butte recovery airfields. The pilot flies to the touch down point using the same Emergency Mission established rules but with the benefit of man-in-the-loop control to minimize hazard exposure to people on the ground, thereby enabling safety containment. The hazard circumvented is touch down into an unplanned location with risk of harming people

on the ground. For loss of alternator power and flight within the confines defined herein, there is sufficient battery capacity to enable continued powering of core systems to effect return and landing at either El Mirage or Gray Butte.

12.2 Lost Link Mission: This contains features to prevent aircraft flyaway by flying a predetermined course to reestablish link. This function is the same as used across all GA-ASI platforms and is implemented within the triplex flight computer therefore having the same integrity as the flight critical elements.

12.3 Prevention of fly away at loss of the triple flight computer function is accomplished by the tail servos moving full trailing edge up and engine controls set to shut down. This is effected by the servo electronics programmed to move to preprogrammed default positions after loss of valid flight computer commands. The engine control electronics similarly default to engine out at loss of flight computer propulsion commands. To assist in voice communications capability for these emergency cases, backup radios are contained in the GCS. If the backup radios cannot establish communications, the crew utilizes a land/cell/sat phone and calls the appropriate controlling agency.

13. COMMAND AND CONTROL

13.1 The datalink is maintained by either the C-band Line-Of-Sight (LOS) system or the Ku-band Satellite Communication (SATCOM) system. These systems are common to all GA-ASI UAS operations.

13.2 Pilot control commands and returned telemetry are conveyed via these datalink systems using a common data format.

13.3 Ground Datalink Terminals (GDT) are comprised of a C-band GDT and a Ku-band GDT. Maximum range of the C-band GDT is about 130 nautical miles (nm). The Ku-band SATCOM GDT is limited only by satellite coverage.

14. CONTROL STATIONS

14.1 Ground Control Station - The Predator B aircraft is flown by a pilot from a Ground Control Station (GCS). The GCS can be located in a building or in a portable shelter. The GCS incorporates two identical side-by-side Pilot / Sensor Operator (PSO) workstations. At any given time one PSO is assigned to the Pilot mode and the other to the Sensor Operator. A centrally mounted switch, under the control of the Pilot, determines which of the PSO workstations has been assigned control of the aircraft. The switch essentially toggles the modes of the PSO stations permitting pilot control to be transferred in the case of a PSO malfunction, providing control redundancy for the pilot. The design of the PSO is primarily based on serving the pilot function. When in the Sensor Operator mode the same controls and displays are functionally re-configured for sensor operation. Figures 6a and 6b provide views of the PSO lay-out.

Both PSO stations are connected to the data links. In relation to data link operation, pilot and sensor commands are combined for uplink and the same downlink information sent to both PSO racks. The operating mode of the PSO and the selected display configuration then determines what downlink information is displayed.

The aircraft is primarily operated real-time by the pilot (pilot-in-the-loop) and is also capable of flying pre-programmed missions. The aircraft can be flown line-of-sight to approximately 130nm of the GCS utilizing the C-Band data link, or operated beyond line-of-sight with the Ku-Satcom data link. The pilot maintains contact with Air Traffic Control (ATC) via an ARC210 VHF/UHF radio installed in the aircraft. The Pilot headset audio (Microphone and ear phones) is conveyed to the aircraft radio via the data link. Alternate ATC communications are available through two ARC-210 radios installed in the GCS or through the chase aircraft.

14.2 Pilot Configuration - To provide the pilot's control function, the display and control features of the PSO station are described in the following:

14.2.1 Upper Video Screen – The Upper Video Screen displays a moving symbol of the aircraft over a map (Tracker Display). This enables the pilot to monitor and modify the aircraft's flight plan.

14.2.2 Lower Video Screen – The Lower Video Screen displays imagery capture by a fixed field-of-view nose camera with 30 degree field of view. The nose camera view is the background or "underlay" of information presented on the Lower Video Screen. The overlay to the nose camera video is a HUD style format that shows primary aircraft system operational and performance parameters. The principle information displayed in the HUD is: Angle of Attack, Pitch Angle, Air Speed, Vertical Speed, Engine Performance Parameters, Horizon, distance from the Ground Data Terminal, Gear Position, Current Barometer Setting, Heading, Yaw Rate, and Center of the Field of View. The Lower Video Screen thereby supports the pilot's responsibilities of Primary Aircraft System Monitoring and Performing Takeoffs and Landings.

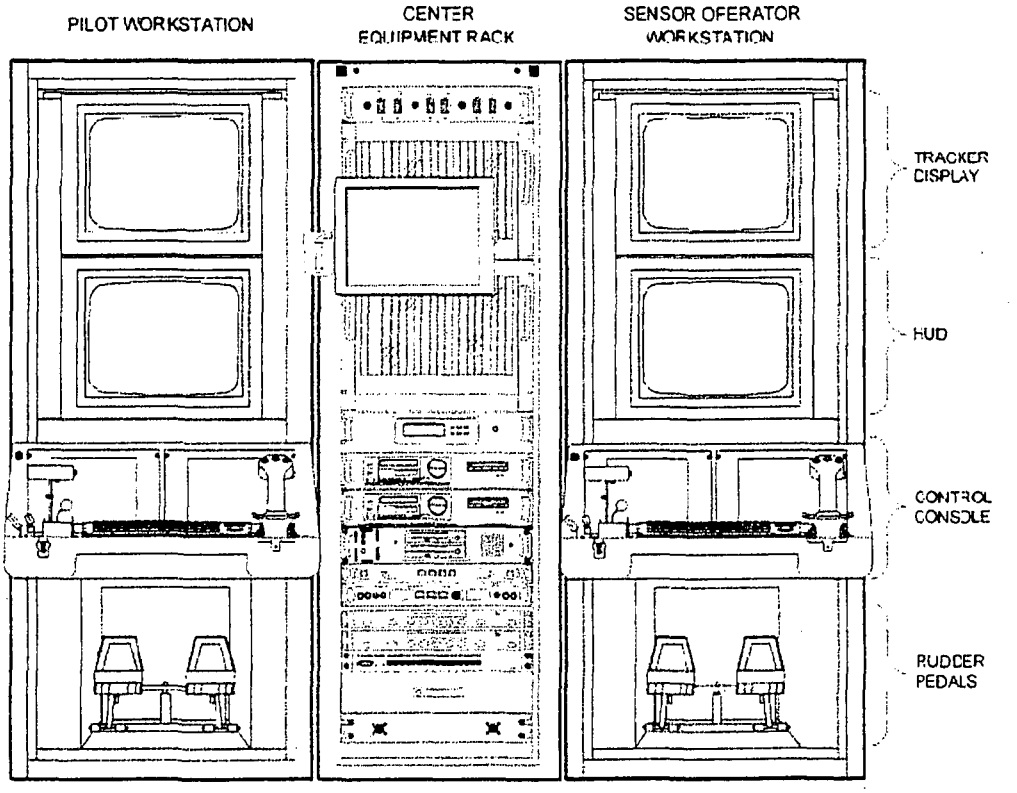

Figure 5a: Ground Control Station

14.2.3 Headset / Microphone Audio – The Headset and Microphone operate the same as in manned aircraft. The headset enables the Pilot to communicate with the Flight Crew, Air Traffic Control, and other aircraft pilots. In addition to aerial communications, the headset also enables the Pilot to communicate with Ground Crew equipped with similar headsets out on the Flight Line.

14.2.4 Flight Controls – Pilot control is performed through a console-mounted joystick for pitch and roll commands, and rudder pedals with embedded foot brake controls. Rudder pedal action jointly controls the rudders and nose wheel steering with gear down and the brake function permits differential control of the Main Landing Gear brakes. In addition, the console also has control levers for engine power and flap control. Buttons are also located on throttle and joystick controls for related mode selection and ancillary controls. Landing gear retraction and deployment are activated through a joystick button and trigger switch interlocked with airspeed limits to prevent inadvertent ground retraction.

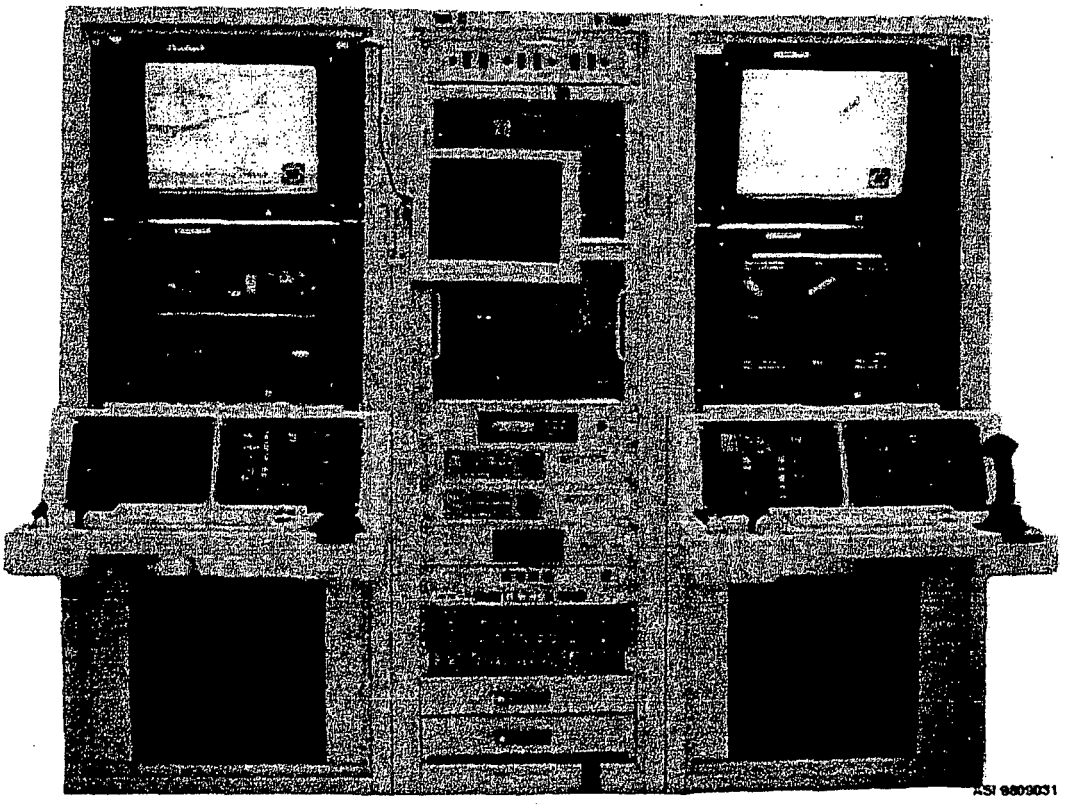

Figure 5b: Ground Control Station

14.2.5 Keyboard – The Keyboard is used in conjunction with the flight controls for overall aircraft system control. Information entered via the keyboard may include Waypoints for Flight Path Navigation, Radio Frequencies for Communication, etc. In addition to entering information, the keyboard is also used to select and configure aircraft systems as required.

14.2.6 Aircraft Control Switch – The Aircraft Control Switch determines which of the two Flight Crew Positions has active control of the aircraft. The switch is located within ready access of the pilot. The Aircraft Control Switch enables the Pilot to designate the PSO workstation to perform all the vehicle control and monitoring activities.

14.2.7 Cumulative System – The integrated system (including information obtained from the Payload Operator and System Engineer) provides the Pilot with Situational Awareness. Situational Awareness supports all the Pilot's responsibilities: Pilotage, Communications, Takeoffs, Landings, and Primary Aircraft System Monitoring and Configuration.

15. CONTROL FREQUENCIES

15.1 The PREDATOR B aircraft is controlled by either a C-band line-of-sight (LOS) or a Ku-band over-the-horizon Satellite Communications (SATCOM) data-link system. Control signals are processed by the PSO workstation and sent to either the C-band Ground Data Terminal (GDT) or the Ku-band SATCOM GDT for transmission to the aircraft.

16. SOFTWARE

16.1 Updates - GA-ASI uses the waterfall model of software development in which software is developed in distinct, sequential steps. The development process may revert back to an earlier step to address change recommendations.

16.2 Development Process -The Predator B UAS System Program will be developed and produced using standard software engineering practices as defined in Institute of Electrical and Electronics Engineers/Electronic Industries Alliance (IEEE/EIA) Std 12207.

16.3 Requirements - the software requirements development process consists of software requirements analysis, followed by documentation of software requirements in Software Requirements Specification (SRS) and Interface Requirement Specification (IRS). The process formulates and documents software functional and performance requirements, interface requirements and constraints; responds to requests for clarification, correction, or waivers/deviations; analyzes impacts; develops and revises the SRSs and IRSs if needed; and manages the requirements baseline and change process. The activities to develop the SRS are described as follows:

16.3.1 Use the Dynamic Object Oriented Requirements System (DOORS™) requirements database to describe the system requirements allocated to software to the level of detail needed to describe the systems software capabilities.

16.3.2 Perform a Software System Safety analysis to identify any additional software safety requirements.

16.3.3 Produce a draft of the SRS. Perform preliminary analysis of document.

16.3.4 Provide a traceability matrix between the SRS and the System/Segment Design Document (SSDD) and other applicable requirements documents.

16.3.5 Distribute the SRS for review.

16.3.6 Perform a requirements walk-through to ensure that the SRS meets the system requirements allocated to software.

16.3.7 The approved SRS is placed under configuration control and base-lined.

16.3.8 A customer review is held and the document is updated as appropriate.

16.3.9 Initial SCRs are generated from the approved SRS.

16.4 System Qualification Testing - A System Qualification Test Plan (SQTP) is generated to plan and perform system software/hardware qualification testing. System Qualification Test Procedures are generated documenting the test steps to be run to verify each requirement in the SSDD for that system. A requirements traceability cross reference matrix is provided, using the project wide requirements traceability database or DOORS™, to document the test(s) that satisfy each SSDD requirement. A Qualification Test Report (QTR) is generated for each system to be qualified, documenting the results of testing. The Test and Evaluation IPT (T&E IPT) is responsible for generating the appropriate test documentation. The T&E IPT Lead is responsible for conduct of the tests.

16.4.1 The Predator B program uses a series of builds to integrate the various components of the system. This allows progress to be measured and demonstrated as more capabilities are added to the baselines. The testing processes described in this document, up through System Qualification Testing (SQT), is used on each of the components as they are approved for delivery and test. The Production Prove-Out Test Plans and Report (PPOTPR) as defined in the Contractor Test Plan (CTP) are used to verify/validate the entire systems performance. This is accomplished by conducting tests, demonstrations and inspections and producing analysis with which to determine a systems compliance with specifications.

16.4.2 The PPOTPR is the T&E IPT's approved and witnessed series of tests that demonstrated compliance with the requirements set forth in the Predator B Project SSDD. System Qualification is conducted in accordance with GA-ASI Engineering Instruction I-049. Each procedure addresses entry criteria, principal responsible party, activities, exit criteria, and applicable metrics.

16.4.3 Independence in System Qualification Testing - System Qualification Testing is accomplished by the T&E IPT. The System Test and Qualification group is organizationally independent of the software development team.
16.4.4 Systems Integration Lab (SIL) Testing – Upon completion of the peer review / testing performed by the Software Engineering Group, the software is released to the T&E IPT for testing in the SIL. Full functionality and regression testing is performed to ensure that the new release works as intended (meets the requirements) and has not introduced any "bugs". System issues are written-up and discussed during the weekly software review meeting.

16.4.5 Preparing for System Qualification Testing - Predator B System Qualification Testing is conducted at the most appropriate test facility. Test facilities can include

contractor, government or independent facilities. Following SQTP plan approval the program then precedes to a series of verification and validation Tests. Demonstration Tests (DTs) following the conclusion of qualification activities, a customer approved and witnessed Acceptance Test Plan (ATP) is performed, demonstrating the operational performance capabilities of the system.

- Plan System Qualification Tests
- Develop Test Cases
- Develop Test Procedures
- Prepare Test Environment
- Assure Readiness for System Qualification Testing
- Conduct Test Readiness Review
- Dry Run System Qualification
- Perform System Qualification Testing (Execute Tests and Collect Data)
- Revision and Retesting as needed
- Analyze and Record System Qualification Test Results
- Analyze and Evaluate Results
- Report Test Results

All Predator B test plans and reports are placed under configuration control and submitted to the customer for review and approval.

16.5 Release Management - Release activities are a primary function of the Software Configuration Management (SCM) Specialists. The SCM Portal is the official release repository.

16.5.1 CSC Release Process - To release a Computer Software Component (CSC), SCM will:

Move release files from the incoming directory to the SCM Internal code repository at O:\Scm\Internal\CSCI Code.

Use the SCR management tool to verify that at least one SCR is tagged with the program name and Computer Software Configuration Item (CSCI) Version, authorizing each baseline change.

Use the SCR management tool to verify that each SCR is at the Ready for Release state. In particular, verify the listed information in the following tabs:

Legacy Data

Development Branch.

Hardware Impact.

CSCI/Release Info

Either a checksum value or a file size value has been entered.

The parent value is correct.

The release date is not earlier than the date of the email notifying SCM that the CSC is ready for release.

All remaining fields are complete.

Move all related SCRs to the Closed – Released notes from the closed SCRs, check them into source control and submit for peer review.

Once approved, post Release Notes to the SCM Portal.

Post binary files and release notes to the release filSend email notification to submitting Software Management Team (SMT that the CSC is released, with a cc: to Zz_ASI SCM.

Update the CSC Releases tally on the SCM Portal Reports tab.

Update the SCM Release Status board with the release date and time.

The SCM Specialist shall inform the SMT member of any discrepancies.

16.5.2 A Software Release Authorization form authorizes the external release of a version of system software for a particular program (e.g., USAF Predator, Italy Predator, etc.). This form must have GA-ASI and Customer Authorization (marked PASS or PASS WITH CHANGES), as well as the endorsement of the Director of Flight Operations, before an Software Version Description (SVD) can be generated. If either the ASI or Customer representative finds any Category I anomalies, the authorization shall be denied by checking the FAIL option on the form and listing the anomalies on page 2 of the form. If the PASS WITH CHANGES option is checked, all Category II anomalies must be listed on the form.

16.6 Software Quality Assurance - The following paragraphs describe Software Quality Assurance (SQA) activities performed to ensure that software development processes follow the requirements of the ISO 9001 Quality System Procedures, Engineering Department Instructions, and this Predator B Software Development Plan.

16.6.1 Software Quality Assurance Evaluations - SQA performs verification activities such as audit and surveillance of Software Department personnel on a regular basis. The audit and surveillance activities verify the following:

- Software development processes are completed and documented per applicable Engineering Instructions, including requirements verifications, design verifications, test plan verifications, code verifications, etc.

- Software engineering personnel are trained and knowledgeable of applicable procedures.
- Designated metrics are collected and used by software management.
- Customer identified software problems (bugs) are investigated and appropriate corrective actions taken.
- Validation activities of software changes by flight operations personnel at the El Mirage and Gray Butte facilities are recorded and provided to Software Department personnel.

16.6.2 If SQA audit and surveillance activities identify a significant or repetitive violation of requirements related to the software processes or products, the results are documented on an Audit Finding and Corrective Action form and a formal corrective action plan is developed. The responsible manager identifies the cause of the problem and appropriate near term and root cause corrective action, and the corrective action plan is approved by SQA. In addition, SQA monitors implementation and verifies that the corrective action was effective. The Audit Finding and Corrective Action results are available on line.

16.6.3 SQA prepares and maintains records of each SQA activity. These records are maintained for the life of the contract.

16.6.4 Independence in Software Quality Assurance - SQA audit and surveillance activities are led by personnel from the GA-ASI Quality Programs organization, which is organizationally independent of the Software Department. The Director of Quality Programs reports directly to the GA-ASI Aircraft Systems Group (ASG) President. Personnel from the Software Department may be added to an audit and surveillance team on a periodic basis for their training.

17. PERFORMANCE CHARTS

Predator B performance charts are provided in the most recent MQ-9 Reaper Flight Manual, document number TO 1Q-9(M)A-1S-1.